IPENZ TRANSPORTATION GROUP CONFERENCE 2016

ROADSPACE ALLOCATION FOR BETTER STREETS

TIM CUTHBERT BENG, MSc, DMS, MCIHT, CMILT

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ABSTRACT

A recurrent challenge in contemporary transport planning is how best to allocate our valuable roadspace to ensure street-users are put first and the transport system delivers the connectivity that people/businesses require.

With increasingly ambitious plans for housing growth and job creation there is widespread recognition of the need to incorporate more positive provision for mass transit, walking and cycling within our roadspace; helping to improve accessibility and encouraging more sustainable travel. There is also growing awareness of the importance of creating high quality environments in our towns/neighbourhoods to attract more people, enhance community life and encourage investment.

This paper considers the approaches taken to street/corridor design in a number of different towns in the UK. Tailored to the complexity of the individual locations and varied in line with resource availability, common themes include consideration of both the link and place functions of the street and close working with user groups to help confirm the idealised design requirement for each mode of transport. Where space is tight and adjudication between modes is required, priorities are typically determined according to a notional user hierarchy. One of the more innovative approaches described is the pioneering Roadspace Allocation Framework which provides a mechanism to help translate wider network requirements into local level design guidance.

The case studies chosen illustrate the challenges faced in transforming roadspace at a range of urban locations together with the emerging solutions.

INTRODUCTION

Since the publication of documents in the UK such as Link and Place and Manual for Streets (1/2) the relationship between urban space, people and transport provision in our towns and cities has started to be viewed through a different lens.

New approaches to urban street planning and design are now being embraced to reflect the dual functions of street as Links (movement conduits) and Places (destinations in their own right). The guidance contained in these documents, alongside growing experience of integrated design, stakeholder engagement, implementation and evaluation of real world schemes, continues to help practitioners shape our future street space.

Meanwhile the context for urban land use and transport planning has not been standing still. At one end of the spectrum, there is an ever greater pressure to intensify development around central, high accessibility nodes and at the other, a growing need to provide multi-modal access to edge or out of town locations to help open up otherwise unsustainable development opportunities.

High capacity bus or light rapid transit systems continue to be conceived to run along our transport corridors and bring their own specific roadspace requirements whilst the environmental and health benefits of promoting schemes to encourage walking and cycling are widely acknowledged.

Looking to the future, technology continues to advance apace and in the right circumstances offers the potential for cars to be used in different ways. For example, city car clubs now offer the chance

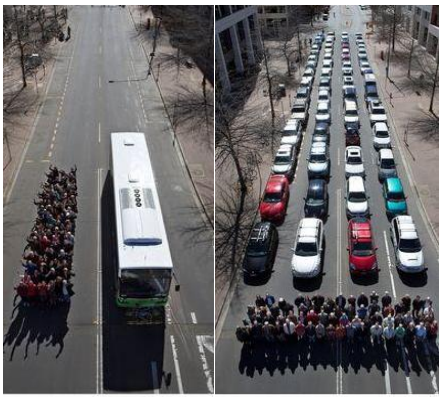
for individuals to use vehicles on demand rather than through personal ownership. This raises new challenges around parking provision particularly if coupled with low emission technology where kerbside charging infrastructure might also be required.

Throw in the daily requirement to facilitate access and service to properties and businesses fronting our streets and the conundrum of roadspace allocation begins to emerge.

Wherever the transport system might end up in the future, it is a fairly safe bet to assume that our roads will remain at its heart. Even the most futuristic visions that incorporate advanced technologies such as driverless vehicles, rely on these key arteries that connect our homes, businesses and leisure destinations, to provide the conduit for private and personal urban mobility, both motorised and non-motorised.

So how then can we maximise the amenity that is afforded by these corridors?; for any given location what is the right balance in the roadspace allocation to serve the often competing needs of different street users?; and how do we design to help promote contemporary and future developments in urban mobility?

ROADSPACE ALLOCATION METHODOLOGIES



The challenge of how best to allocate roadspace is not a new one; it is a problem that transport planners and engineers have been wrestling with ever since a multi-modal approach to transport provision has been taken seriously. Not surprisingly a variety of different approaches has been tried, typically linked to the preferences of the promoting authorities, and often with varying degrees of success. For example, on occasion a mode specific approach has been adopted to champion the cause for bus priority or cycling. Whilst this might deliver for a particular road user group it potentially results in a lower amenity for others. On other occasions approaches to roadspace allocation have been more 'engineering led' resulting in in more utilitarian solutions that have little reference to the local urban environment.

Fortunately, roadspace allocation methodologies have been maturing in recent years and a more holistic approach is becoming the norm. At the same time a new breed of professional is emerging who is able to blend skills in transport planning, urban design and engineering to help transform streets into places as well as efficient movement corridors. This new discipline is sometimes referred to as 'integrated design' and uses a highly collaborative approach that involves close working with road users and community representatives to understand aspirations and determine priorities.

An important point to note at this juncture is that there is not a one size fits all methodology but there are some common themes running through good practice examples. What follows below are details of a number of recent project examples drawn from a variety of locations within the UK. Each project has addressed the roadspace allocation problem in a slightly different way but in broad terms all have sought to address the following aspects to greater of lesser levels of detail;

- Objective Setting
- Considering the role of the street (ie the relative link or place functions)
- User Group Requirements
- Problem Definition
- Prioritisation of Interventions
- Developing Concept Designs

In practice the approach adopted for any individual location will be dependent on a range of factors including the scale/complexity of the project, the resources available for scheme development, the project timescale, any established channels for stakeholder engagement and the local politics of the area.

PROJECTS IN THE MAKING

Birmingham

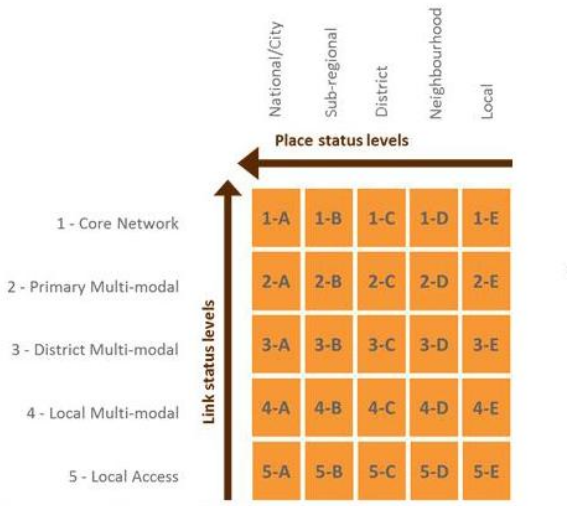
Birmingham is the second largest City in the UK with a population of over 1.1 million people that has grown by around 10% over the last decade. It is home to a number of universities which contributes to its status as the youngest city in Europe, with under 25's accounting for nearly 40% of its population. Surrounded by the West Midlands conurbation which is experiencing rising car ownership levels there is growing demand for travel to/from and within the urban area.

In 2012, the City Council set about preparing an Action Plan for Urban Mobility (Birmingham Connected), to identify priorities for public and private investment in transport infrastructure in Birmingham, reflecting the anticipated demand for travel in and around the city. Following a baseline review of the city's transport system the Birmingham Mobility Action Plan (BMAP) Green Paper, published in November 2013, made the case for a radical rethink of transport provision to better serve future land use proposals, address changing demographics, improve accessibility and promote a more socially inclusive city,

Whilst BMAP put forward the case to fundamentally re-imagine how road space is used across the City, there was a requirement to demonstrate that this was the right approach and would be supported by the community and other key stakeholders. In response to this challenge a new roadspace allocation framework was adopted to provide an evidence base to support the Birmingham Connected proposals. Grounded in the proven link and place methodology, the forward –thinking and innovative approach is outlined below.

The Roadspace Allocation Framework In broad terms the Roadspace Allocation Framework provides a fair and consistent basis for prioritising roads user requirements and allocating roadspace. It also helps translate wider requirements for networks into local level design guidance and is a useful tool to help politicians and members sell any compromises more easily, particularly if they can point to a compelling wider vision.

The approach involved developing a bespoke link and place framework for a particular location. The principle behind Link and Place is to account for the competing needs of street users, recognising a streets function as both a link – a road or path where users pass through – and as a place – a destination in its own right. This approach offers a proven technique for reassigning road space between competing uses, with a greater emphasis on the functions of place and people.



A data gathering and review exercise was undertaken to establish the availability of datasets to inform a Link and Place classification of the network. Using mapping software the dataset was mapped as layers, and filters applied to assemble each of the Link and Place types.

A process was developed for applying the link and place framework, and a number of case studies at sites across the City were considered to test the process. Through this approach some core principles were developed as to how the framework might be applied in practical terms, so that each street could best achieve the requirements of the people using it, and the wider aspirations of Birmingham Connected. The ultimate aim was to be able to classify any street accounting for fine grained details (including frontage development such as schools or listed buildings, blank verges, or residential areas) as well as key transport roles such as bus corridors or cycle routes. This would result in a powerful tool for understanding how to prioritise measures across wider areas based on the detailed local demands of each section of street.

Following the review of the transport network a five-by-five Link and Place matrix was developed. The matrix comprised the following:

- 5 Link statuses: 1 – Core Network, 2 – Primary Multi-modal Link, 3 – District Multi-modal Link, 4 – Local Multi-modal Link, 5 – Local Access; and;
- 5 Place statuses: A –National/ city region level, B – Sub-regional level, C - District level, D - Neighbourhood level, E - Local Level.

As well as the core Link and Place classifications, it was also necessary to define some parameters for areas that do not fall within these place categories, including Off-Network Sites, such as out of town shopping centres and industrial estates, and Interchange sites such as rail stations.

The anticipated future network– incorporating proposals for the public transport network, freight network, cycling revolution routes and new interchanges was also classified.

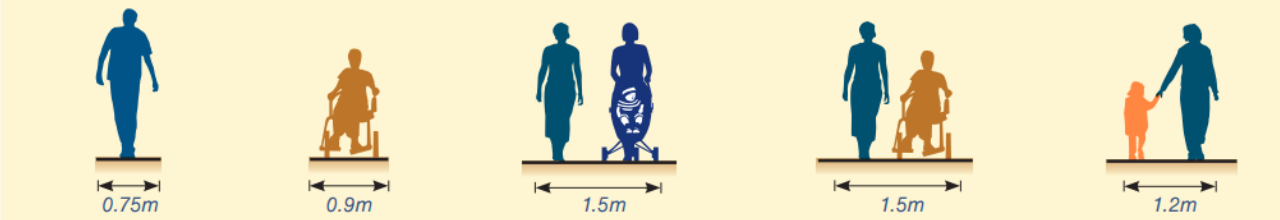
User Group Requirements The requirements of different street user groups (bus users, cyclists, freight operators etc.); their street activities (driving, parking, boarding-alighting, window shopping etc.); and their associated street design needs (i.e. width of a bus lane, area of a cycle stand) were identified by practitioners. Design requirements, both minimum and desirable, were recorded to identify road space needed.

The roadspace allocation methodology followed three broad steps:

- Step 1 – Consider Street Classification: identify the link and place functions of the street section;
- Step 2 – Consider User Groups' Requirements within Local Conditions/Context: determine existing and planned future requirements of the local street section; and
- Step 3 – Meeting the User Requirements: allocate roadspace in accordance to the notional user hierarchy and the priority link and place user requirements.

As a starting point, the idealised or desirable design requirement for each use group was considered. Where there was sufficient roadspace for all the desirable lane designations and street furniture - no further guidance was required.

Typical minimum widths required by pedestrians and wheelchair users



In reality the way street patterns and road networks have evolved in much of the City was seldom conducive to the multi-faceted demands of contemporary society. So in all other cases the Link and Place guidance served to adjudicate between competing user requirements – to best achieve the wider objectives of a scheme.

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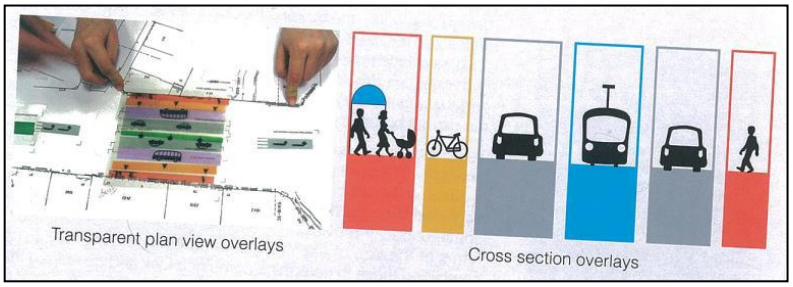
If the minimum design requirements for each competing user requirement could not be accommodated, the broad options open to the design team were:

- Share the space – deploy schemes or measures to enable scarce street space to fulfil multiple user requirements;
- Allocate the space by time – utilise measures to enable roadspace to fulfil multiple user requirements by time of day;
- Direction based allocation – use innovative measures to reallocate capacity to tidal flows of traffic public transport or active travel; or
- Prioritising key users where all-inclusive solutions could not be found – where no design solution could be found to accommodate all user requirements, a strategic decision was taken to review and revisit the Link or Place classification, perhaps as part of a wider initiative such as a regeneration scheme or a by-pass.



If the design options for a particular site could not accommodate the minimum standards, one or more of the user requirements (e.g. a cycle route, bus or BRT route, parking) had to be reassigned/relocated. The process to determine which modes had priority on a particular street section took into account several factors, including the notional Link and Place User hierarchies, and the feasibility of shifting provision.

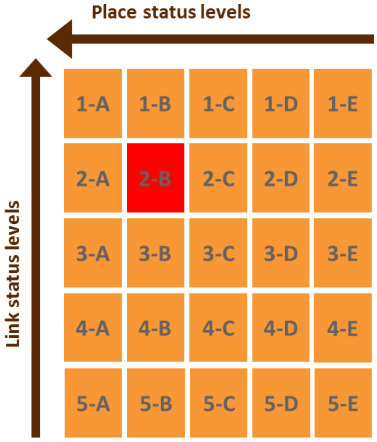
At this stage it was critical that the user requirements were prioritised consistently with the wider aspirations of the area. For example, at the heart of the Birmingham Connected vision is an integrated mass transit network of Tram, Metro and BRT routes, underpinned by a complementary bus network. For this vision to become a reality and bring about real change, it was fundamental that the integrated mass transit network was delivered completely and coherently - as such public transport was prioritised wherever a route had been proposed.

A series of case studies was undertaken to road-test the Link and Place framework within different street environments across Birmingham. A typical example is shown below.

CASE STUDY - *District Centre (highway dominated)*

Current Link/Place Status – 2B; Example – Selly Oak Local Centre

This case study uses Selly Oak as an example of an important district centre which currently has a highway dominated environment impacting negatively on its quality as a place. The centre is in close proximity to a University and the area presents significant redevelopment and regeneration opportunities. The future link network proposals have a significant bearing on the area, with a bus or BRT route and Cycling Revolution corridor planned. The wider area is also part of a Green Travel District.



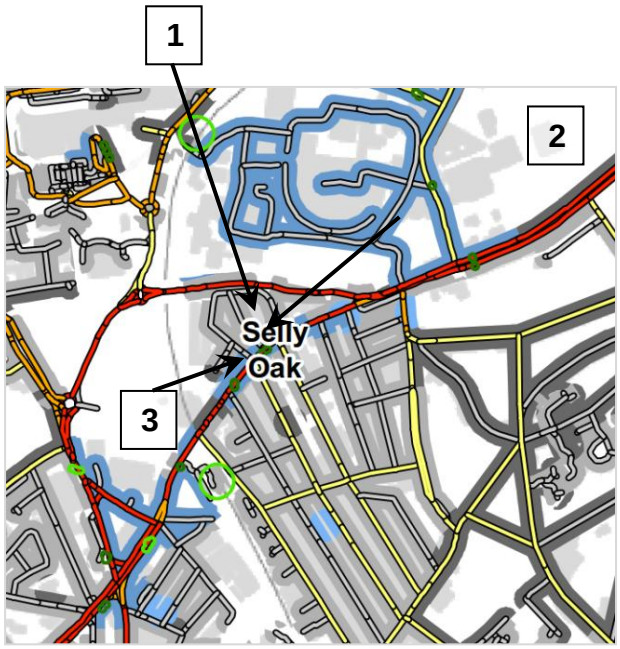
The relatively high Place classification (B) is not reflected in the

quality of the environment. The Link classification is also significant (2), as it is a public transport corridor, with over 35 buses per hour (two-way), rather than just a strategic route for traffic. Nonetheless significant through traffic currently travels via the centre, rather than around the by-pass.

LOCATION 1. Highway dominated environment, wide carriageway with four traffic lanes. Barriers to pedestrian movement.

LOCATION 2. Poor urban realm, underperforming against place classification Under-utilised footway space, potential for greater place emphasis.

LOCATION 3. Character building at the heart of the centre – a natural place focus, adjacent to a key desire line onto the nearby University.



Place Requirements			Link Requirements		
	Pedestrain/ Cyclist Crossing Facilites	√		Sprint Route	√
	Private Accesses - residential, commercial	√		CityLink Route	
	On-street Parking - Residents			Other Bus Route	√
	On-street Parking - Retail			Strategic Freight Route	
	On-street Parking - Services			Weight restrictions	
	Disabled Bay				
	EVCP Bay			Height restrictions	
	On-street delivery/servicing	√		HGV restrictions	
	PT Interchange site	√		Green Travel District	√
	Mature Trees. Valuable Green Spaces			On-street Cycle route	√
	Critical Street Furniture - signals boxes etc			Shared use cycle path	
	Schools/ Colleges/ Universities	√		Strategic Traffic Route	
	Hospitals/ Surgeries/ GPs			20 mph zone/restrictions	
	Street Markets / Event Spaces	√		Mature Trees, valuable green spaces	

MAP KEY

Link Classification II - Primary Multi-Modal Link

Link Classification III – District Multi-Modal Link

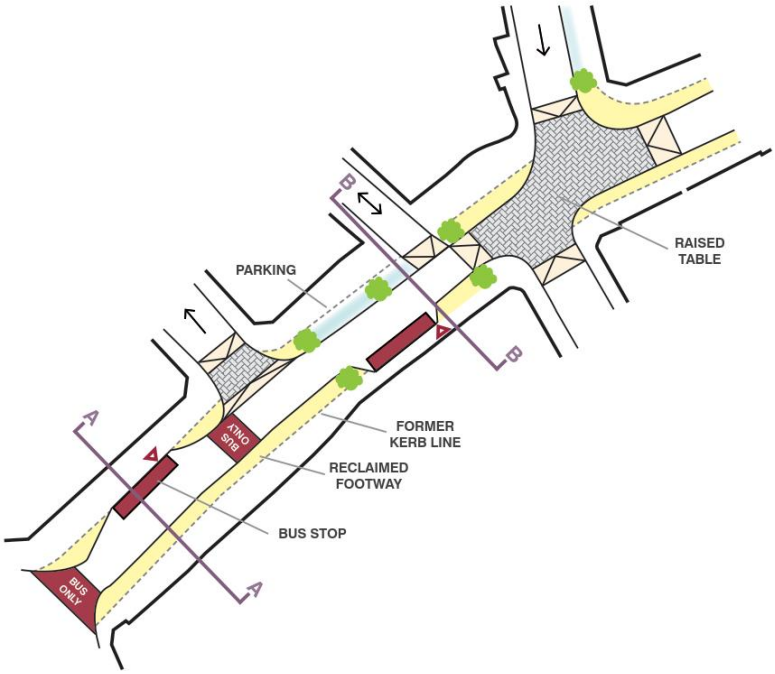
Link Classification IV - Local Multi-Modal Link

Link Classification V - Local Access

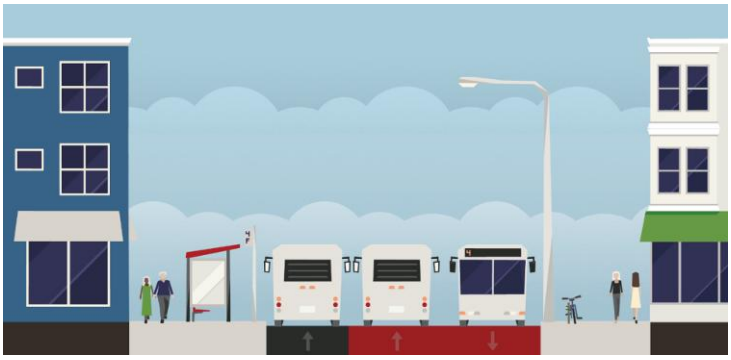
The street classification for the case study area selected is Link level 2, and Place classification B. The Link level is derived through the high bus frequencies. Its future link status is as Link level 2, with a BRT route and key cycle corridor. To the north of the site is a University, another large Place B centre, and a considerable focus of activity. To the South is a predominantly residential area.

The particular section selected includes on-street parking, a need to provide for residential access, and some delivery and servicing provision. Critically the site must accommodate a BRT route in accordance with at least the minimum standards to enable it to operate effectively, including Super-stops, and high quality cycle route

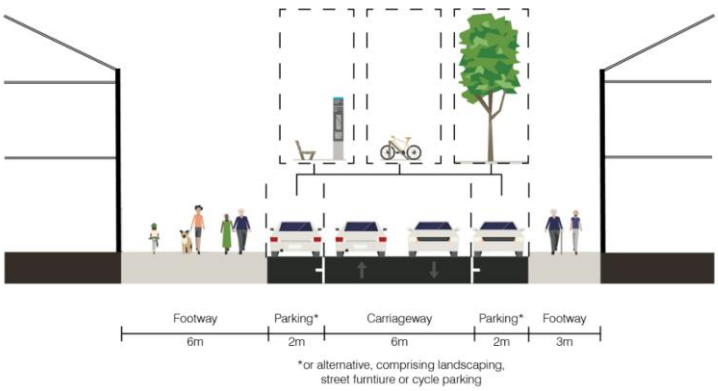
Longitudinal Section – Bus-only section and reallocation of roadspace to footway with improved crossings and urban realm.



Cross Section A – Bus-only Section with BRT super-stop



Cross Section B – Traffic lanes replaced with short-stay parking, cycle parking or urban realm improvements



The introduction of a short **bus-only section** would serve to **break the link** as a continuous route for through traffic, and encourage traffic to reroute around the centre via the bypass, whilst still enabling local access via suitable side roads without necessitating an unduly circuitous route.

By significantly **reducing the volume of through traffic** there is greater scope to safely reallocate roadspace to the priority user groups – which in this instance are bus users, place users and cyclists.

The bus-only section can accommodate a **northbound super-stop, in close proximity to the southbound stop**. It can also serve as a defined gateway to the heart of the district centre, and demark an area of low traffic activity.

The carriageway can be reduced to a single lane in both directions, enabling provision of **widened footways**, significantly improving the pedestrian environment.

The introduction of raised crossings and a generous raised table at the heart of the centre, on a **key desire line to the University**, finished with textured or coloured surfacing, street trees, planters, street art and quality footway materials throughout – centred around an existing character building will enhance public realm in the area and help self –enforce lower vehicle speeds.

The **low traffic environment** would enable the bus services to operate reliably, and foster a welcoming environment for cyclists – complemented by ample provision of cycle parking with natural surveillance. Cyclist access would also be permitted through the bus-only section.

Some **additional short-stay parking** for accessing local shops could be accommodated, which could serve as an off-peak Loading Bay, or alternatively an on-footway loading bay could be provided, which would in effect be shared with pedestrians.

Guildford Sustainable Movement Corridor

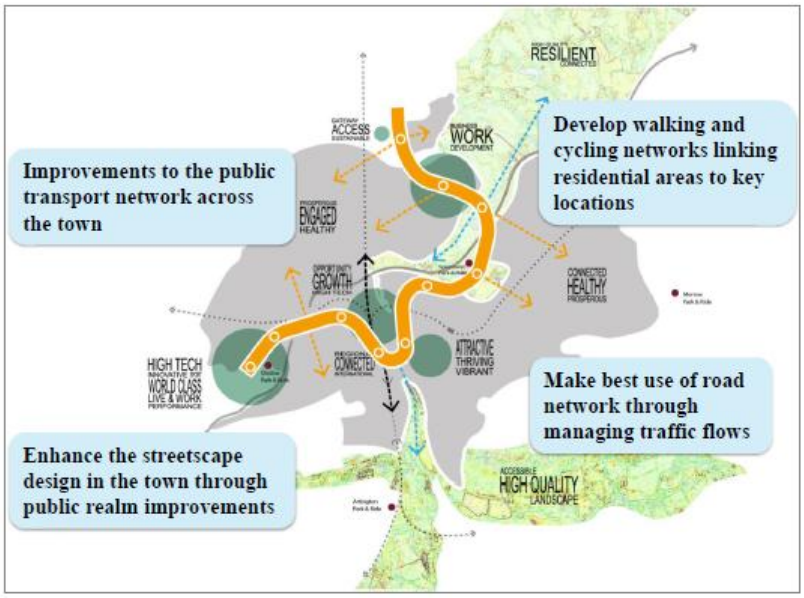
Guildford is a prosperous, heritage town located in the County of Surrey in the south east of England. A university town of some 80,000 residents it is a popular place to live, work or visit for shopping or leisure purposes. Home to a variety of international businesses, the thriving local economy produces one of the highest GVA/capita ratios in the UK

Perhaps not surprisingly Guildford has some ambitious plans for growth including an enhanced town centre retail offer, a significant number of new homes and additional business space. However, a major constraint on growth is the local transport network which suffers from severe traffic congestion during periods of highest demand.

Against this background the 2014 Guildford Town and Approaches Movement Study (GTAMS) developed a headline vision for sustainable mobility in Guildford in 2050 as follows:

"The transport system in 2050 will sustain Guildford as a centre of excellence; with an attractive and thriving town centre; an innovative world-class high-tech employment sector; a high-quality resilient environment; an engaged, healthy and prosperous community; and excellent connections, locally, regionally, and internationally via airports and high speed rail links."

Through a workshop-based collaboration with key road users and other stakeholders the GTAMS study developed a high level transport strategy to support the vision. At the heart of the strategy is a new sustainable movement corridor for Guildford that connects the key elements of the vision. It identifies a route that links the town centre to the University of Surrey's Stag Hill campus, and onwards to the Manor Park/Surrey Research Park/Royal Surrey County Hospital area to the west. It also links the town centre to Guildford College, the Guildford Spectrum leisure complex and Slyfield Industrial Estate to the north.



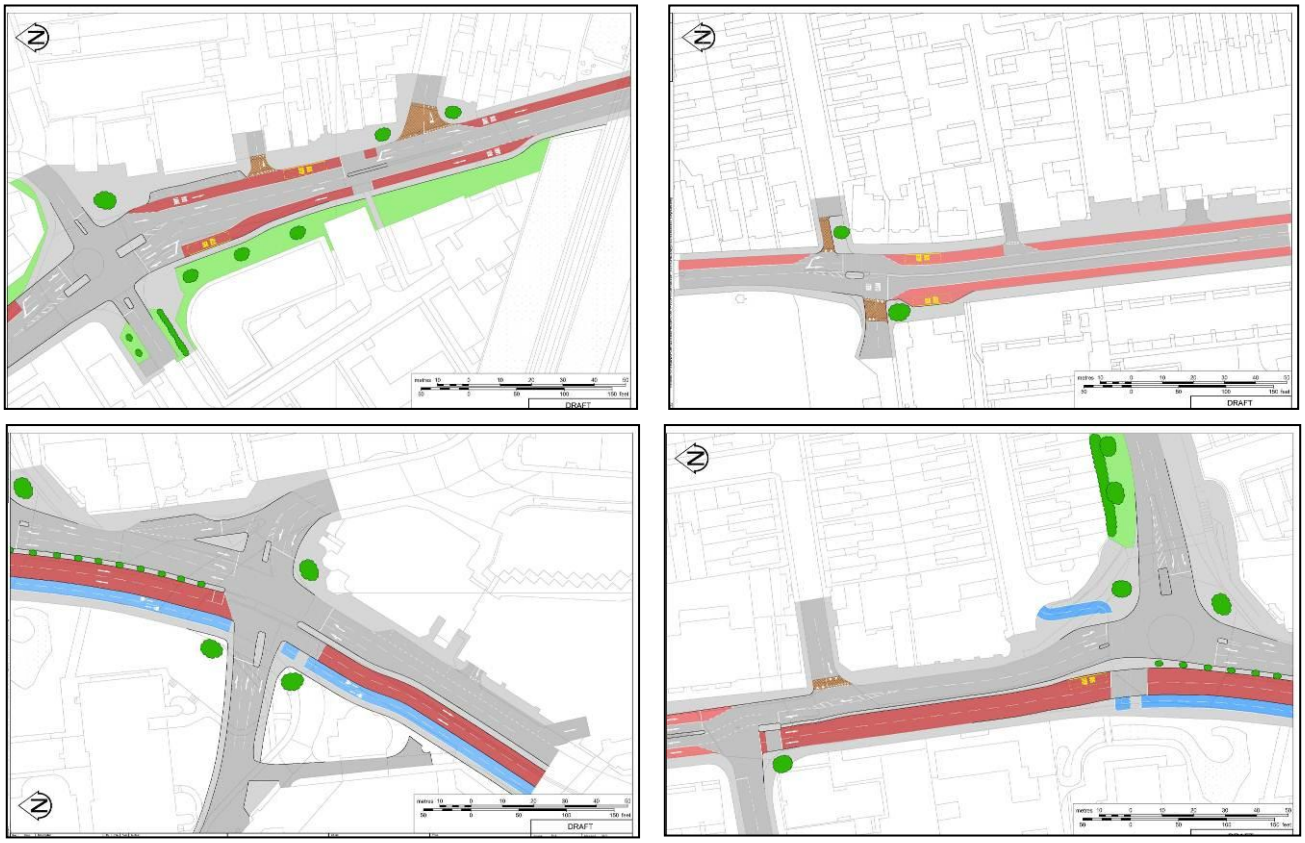
Work is currently progressing to translate the sustainable movement corridor concept into a set of feasible design proposals.

In this example funding for the scheme development is currently very limited and so for the time being a proportional approach has been adopted.

The initial work has involved roadspace analysis by a small, experienced team with the integrated design skills referred to earlier.

Drawing on a combination of desktop research, site work and early engagement with the user groups, a high level evaluation of the link and place functions has been undertaken and used to inform the initial roadspace allocation exercise.

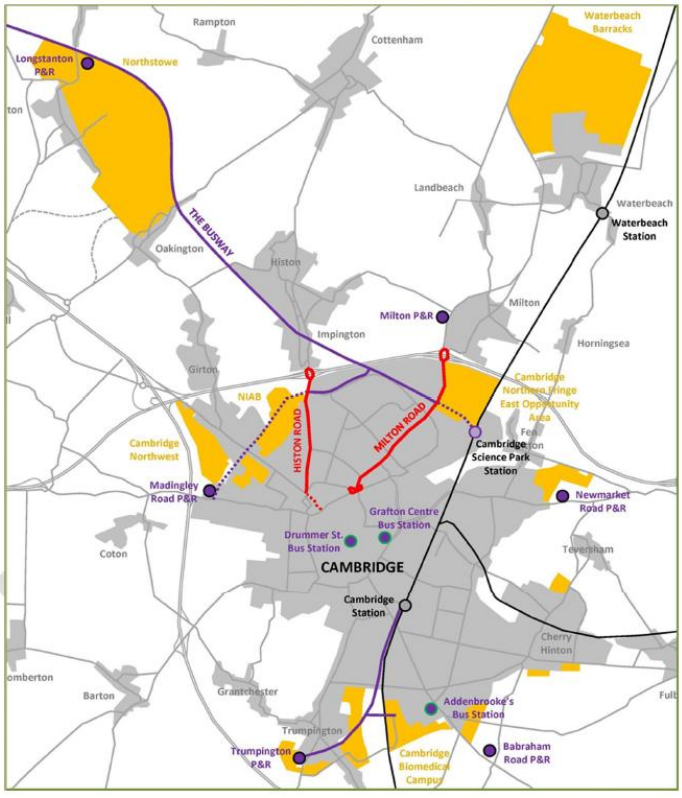
Some of the emerging ideas are shown in the figures below including the concept of co-located, and separate bus and cycle lanes on Onslow Street which is one of the busier transport corridors in the town. To help develop the most compelling case for such transformational change it is envisaged that a comprehensive roadspace allocation framework will be developed alongside a fine grained micro-simulation model to assess the impacts on traffic.



Cambridge – Milton Road and Histon Road

It is widely recognised that Cambridge and South Cambridgeshire have one of the most dynamic and forward looking economies in the United Kingdom. By 2031 it is forecast that the City area will attract some 44,000 additional jobs and that 35,000 new dwellings will be built. The transport vision for Cambridge and the surrounding areas is that more people will use sustainable modes of transport, reducing car usage, protecting the environment and supporting the anticipated growth.

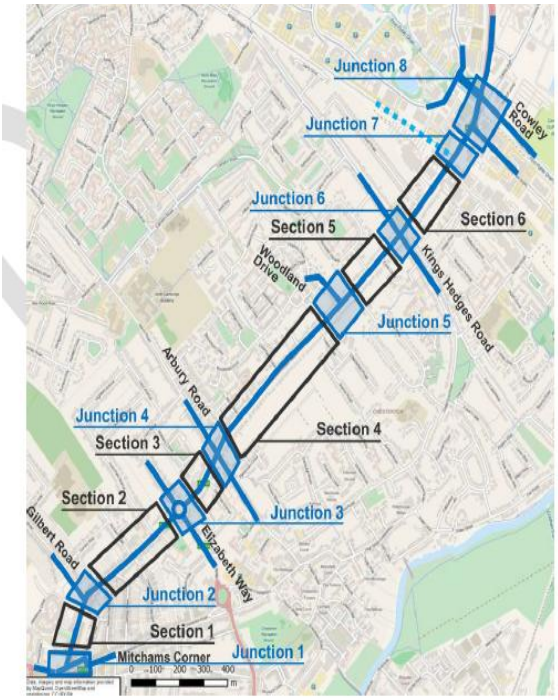
To help ensure that funding will be made available for the transport infrastructure needed to support forthcoming growth, a City Deal was signed in 2014 by Central Government, Council leaders, businesses and the University of Cambridge. The strategy will focus on improving upon and providing a high quality passenger bus and rail network, complemented with a comprehensive pedestrian and cycle network. In the five years from April 2015, £100m of Government funding will be made available and if certain conditions are met, a further £200m may be secured from April 2020 onwards and up to a final £200m from April 2025 onwards



Milton Road, shown opposite within the context of Cambridge, is one of the key radials into Cambridge. It is identified as an increasingly important public transport corridor as part of the Transport Strategy

for Cambridge and South Cambridgeshire (TSCSC) and Long Term Transport Strategy (LT TS). Both the Milton Road and Histon Road corridors are high priority schemes for the City Deal infrastructure programme with both proposed schemes to be delivered by 2020. Histon Road is also a key radial route into Cambridge which is constrained in its width, contributing to congestion and making the consideration of small scale improvements difficult. Both routes will be impacted by the substantial levels of committed development in the North of Cambridge through to 2031 at locations including Waterbeach, Ely North and Orchard Park.

The Performance Review Process



In this example a performance review was used to identify the route sections and junctions that should be targeted for improvement in the development of outline design solutions. The performance review was informed by input from the various road user groups.

To begin with the current performance of each section/junction was assessed against the determinants of the study (bus service delays, quality of public realm etc). These are summarised the table below where red indicates poor performance, amber is average performance and green is good performance. For ease and accuracy of assessment, certain objectives (e.g. public realm) were expanded to provide sub-categories. The performance is based on a combination of quantitative analysis (e.g. collisions data), desktop review, site observations and stakeholder engagement.

CURRENT PERFORMANCE														
Study Objectives		Section 1	Junction 2	Section 2	Junction 3	Section 3	Junction 4	Section 4	Junction 5	Section 5	Junction 6	Section 6	Junction 7	Junction 8
Traffic	- Traffic delays													
Road Safety	- Road safety													
Buses	- Bus service delays													
	- Bus stop provision/quality													
Pedestrians	- Pedestrian crossing facilities													
Cyclists	- Cycle priority measures													
	- Cyclist crossing facilities													
Public Realm	- Quality of the public realm													
	- Provision of trees/planting													
Parking	- Parking provision													
	- Servicing provision													

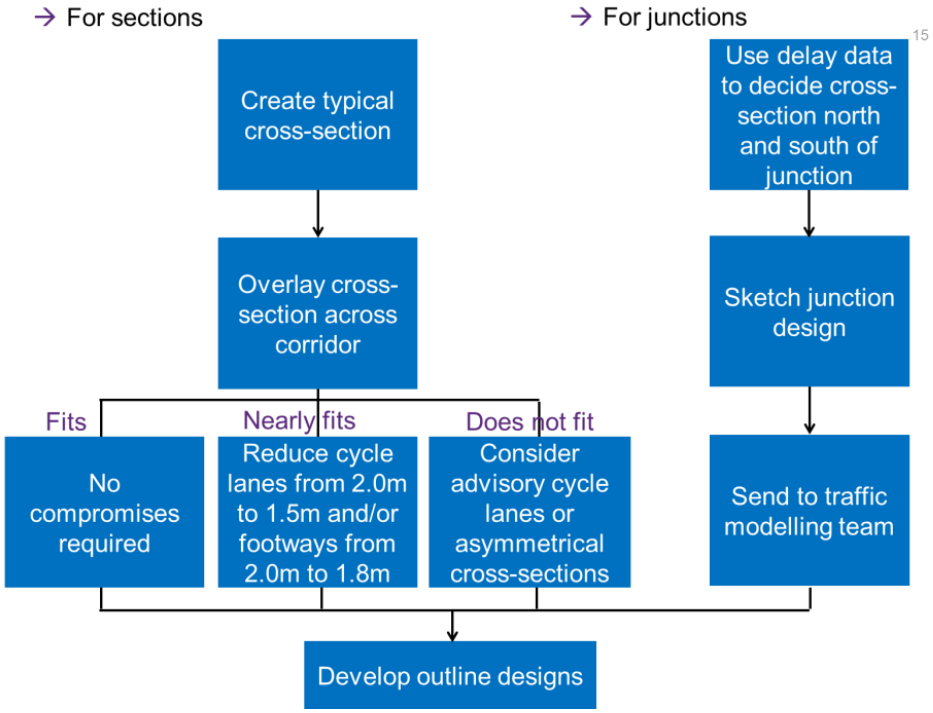
Following the identification of the corridor issues a ‘long-‘list’ of improvement options was developed. The options were packaged as Do Maximum, Do Something and Do Minimum scenarios.

After an initial stakeholder review of the Do Minimum options it was concluded that they would fall some way short of meeting the aspirations of the scheme and if taken forward would only provide localised benefits. This would be inconsistent with the required ‘consistent and integrated’ corridor improvements. As such the Do Minimum package of options was not progressed in its own right to

the outline design stage.

Outline Design Process. The process is shown below and was used to identify how the existing road space could be reallocated not only to achieve the objectives of the scheme but also to comply with the following hierarchy of user needs:

- **Buses: reduce journey time and improve reliability;**
- **Cyclists: improve cycle priority (segregate where possible), route connectivity and**
- **consistency;**
- **Pedestrians: provide adequate footway width and crossing facilities;**
- **General traffic: maintain traffic at today's levels**
- **Public realm: improve quality of public realm; and**
- **Parking: provide for current demand for parking & servicing**



As shown below, typical cross-sections were produced in order to identify the extent to which bus lanes, cycle lanes and footways could be implementation along Milton Road and Histon Road within the highway boundary, or where for relatively short sections land-take would be required.

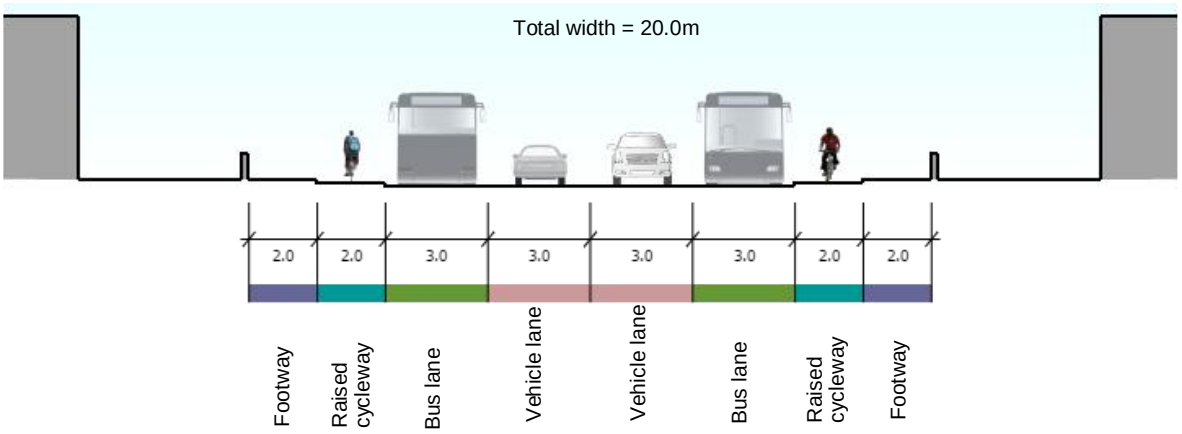
It was assumed that if a significant length and depth of land-take would be required that encroached on developed land with active uses then the cross-section would be categorised as 'Does not fit', as it would render the option unfeasible and as such an alternative cross-section would be considered. The two main cross section scenarios are shown on the next page which, depending on the highway width, could be symmetrical or asymmetrical.

The first scenario is footway/cycleway/bus lane/vehicle lane and the second scenario is shared-use area/bus lane/vehicle lane. The shared-use areas are located where there is a cycleway that intersects with a crossing or bus stop. The minimum widths are also shown on the figures below. These were informed by the precedents provided by recent local corridor schemes for Huntington Road and Hills Road as well as being based on established good practice (including Manual for Streets).

The two scenarios show the optimal design solution which is achievable if there is sufficient width,

however where there is insufficient width then there has to be a compromise with, for example, the introduction of a bus lane in one direction only.

Typical Cross Section - Bus Lane & Raised Cycleway



Typical Cross Section - Shared Use Area at Bus Stops & Crossings

Ponders End

Ponders End, in Enfield, is identified as an area of change. It lies on the A10 / A1010 corridor which is one of the most significant high streets in north London. To the east, and within walking distance, is the Lee Valley regional park. The objective for Ponders End is to re-connect two distinct and disconnected areas within the town centre: the High Street and regeneration opportunities along Queensway. The aim is to help rejuvenate the town centre as a retail destination, providing a welcoming and comfortable series of spaces, making the area more attractive for people to walk and cycle to and, through this, improve conditions for small businesses.

In this case the approach adopted followed the concept of the 'Complete Street' which recognises that streets form the majority of open space and are the lifeblood of our town and cities. Complete Streets are those designed for all users, modes and abilities. Similar to the previous methodologies, the nature of the street is linked to the role and function of the place and, through this, the needs of pedestrians, cyclists, public transport and drivers are re-balanced to create places that cater for all, which contribute to an improved public realm and boost the economic potential of an area. Typically the dominance of motor vehicles is reduced by slowing traffic using proven techniques such as narrowing traffic lanes, raising the level of the road surface and using

unusual paving materials. The process illustrates that designing for all users, for safety, and for great public spaces can successfully go hand in hand.

In Ponders End a comprehensive street design has been developed through simple and creative public realm improvements to enhance local distinctiveness and character, to support high street activity and contribute to a better sense of place and security, whilst also accommodating a range of movement types. Ponders End will also see the first of the successful mini-Holland funding schemes designed. Through this Complete Streets approach it is proposed to unify the High Street and create better connections to surrounding parks and development sites.
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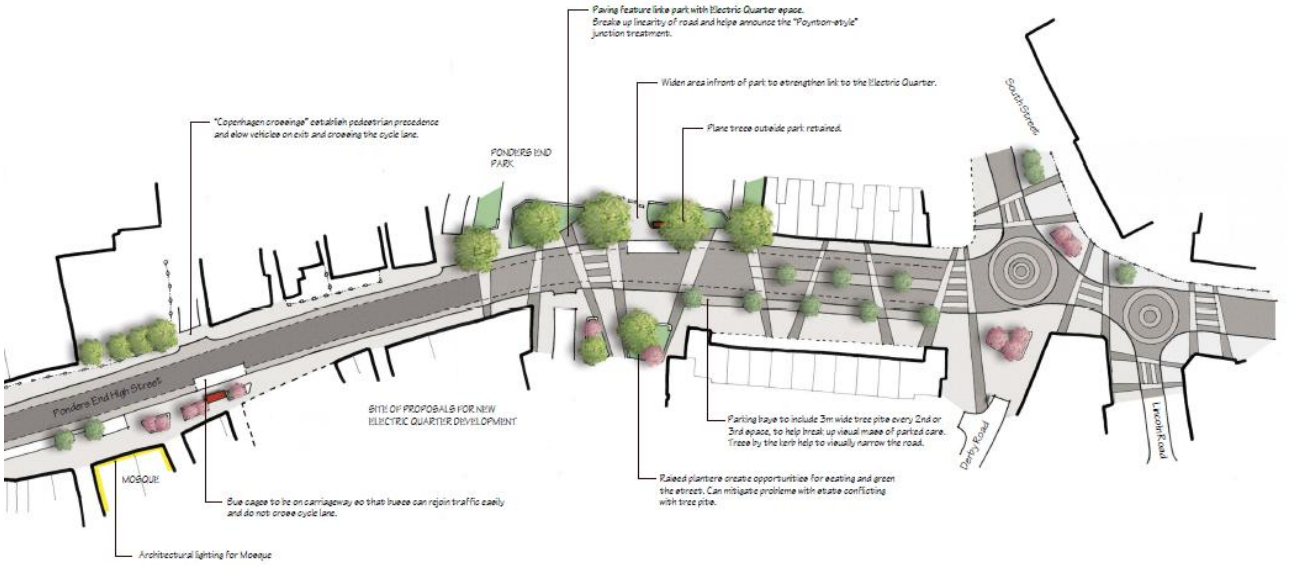

Park Entrance Before and After – Artistic Impression

South Street Before and After – Artistic Impression

The study area includes three distinct sections:

- The existing 5 arm staggered traffic signal junction at South Street will be converted to a shared space roundabout, as successfully implemented elsewhere in London, for example as at Bexley Health. The scheme will blur the traffic priorities between traffic streams and importantly the relationship between pedestrian and motorised traffic. By reducing priority for motorised traffic driver care will be increased, and pedestrians will be given more priority at recognised crossing places. Additionally this also allows a degree of informal crossing, should a pedestrian choose to do so. The scheme is very much about creating slower but steady traffic flow.

- The central section of Ponders End will provide for a single traffic lane in each direction, but with no central markings to slow traffic speed. Segregated cycle facilities will be included along the length to provide cyclists with a high degree of physical separation, creating a cycling environment which is safe for all cycle levels.

- Some elements of the street will be raised to footway level creating a carriageway environment which is different from the main street environment. This approach has been successfully employed in London on the Walworth Road (Southwark), where large flat top tables are commonplace on at junctions. The Park / Retail Arcade section will be reprioritised for the needs of crossing pedestrians and short stay parking to help drive trade. Semi-formal crossing points are provided

Within these three sections traffic engineering approaches were adapted for a range of competing constraints. The design solutions featured innovative new street and junction layouts, to create safer and more attractive cycling routes. They include island protected junctions at major intersections, segregated cycle ways and floating bus stops.

All junction options underwent initial testing using specialised junction modelling software (ARCADY and LINSIG in this case, being the UK industry standard) to understand their broad operational aspects. Innovation played a large part of the design elements, which draw on ideas and techniques used elsewhere around London, the UK and Europe.

CONCLUSIONS

Our urban streets are a key asset. They are the key arteries that link our homes, businesses and leisure destinations. Sitting at the heart of our transport system they provide a conduit to accommodate growing and changing demands for private and personal urban mobility, both motorised and non-motorised.

At the same time our streets are places, destinations in their own right where people might wish to spend time. Importantly, their place function helps defines the social, economic and community well-being of an area. Individual streets perform these link and place functions to varying degrees and as our towns and cities develop it is becoming increasingly important to recognise the interplay between these roles and the implications for street design or roadspace allocation.

Transport planners have been faced with roadspace allocation problems for many years. In the past ‘engineering led’ solutions have often prevailed, sometimes with mixed success. However, in recent years roadspace allocation methodologies have been maturing and a more holistic approach is becoming the norm. Whilst there is not a one size fits all methodology, the move is towards a more evidence based collaborative approach that draws in urban realm and placemaking skills. The approach adopted for any individual location will be dependent on a range of factors including the scale/complexity of the project, the resources available for scheme development, the project timescale, any established channels for stakeholder engagement and the

local politics of the area.

At the more sophisticated end of the spectrum the innovative Roadspace Allocation Framework offers a fair and consistent approach to prioritising roads user requirements and allocating roadspace. Successfully adopted in Birmingham it is helping to provide an evidence base to support schemes emerging through the Birmingham Connected initiative. It also helps translate wider requirements for networks into local level design guidance and is a useful tool to help politicians and members sell any compromises more easily.

Where resources are scarcer and a lighter touch is required, alternative approaches like the performance review process used in Cambridge or the Complete Street technique used in Ponders End, might be more appropriate. Importantly though, the close working with road users and community representatives is pivotal to understanding aspirations and determining priorities.

Whatever approach is ultimately selected for a particular project, scheme promoters should be mindful of the skillset needed to address street design and roadspace allocation in a contemporary way. Encouragingly, there is a new breed of professional emerging that is able to blend skills in transport planning, urban design and engineering to help transform streets into places as well as efficient movement corridors. Such individuals tend to be highly collaborative and are invaluable in getting projects moving in the right direction from the outset.

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